(No Model.)

C. D. HASKINS.

Electric Lamp Regulator.

No. 237,271. Patented Feb. 1, 1881.

Fig. 1.

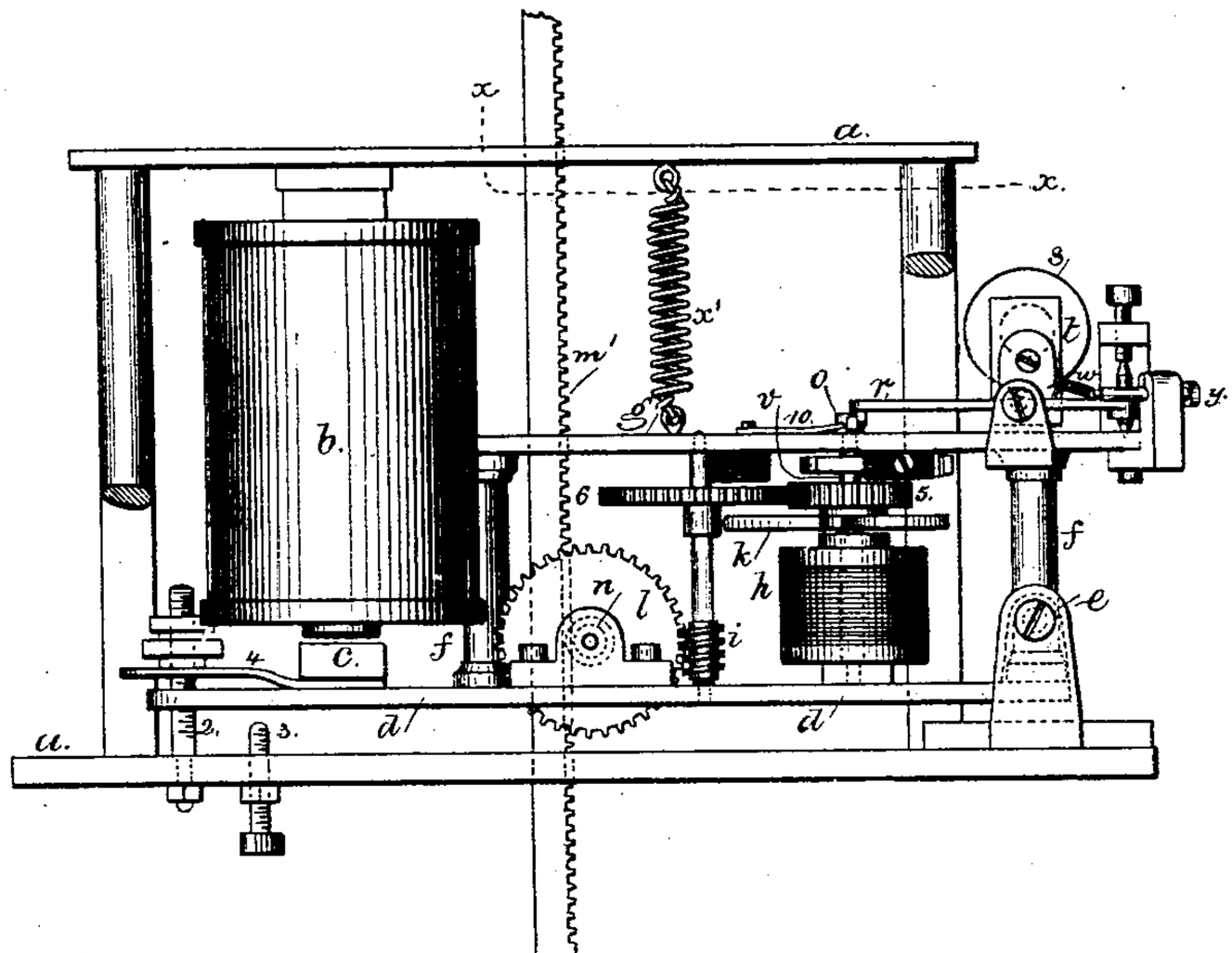


Fig. 3

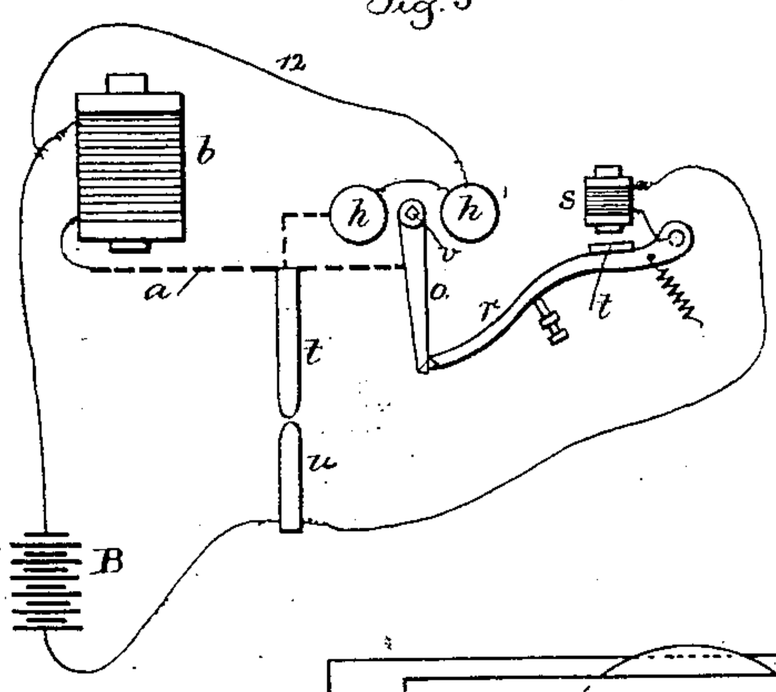
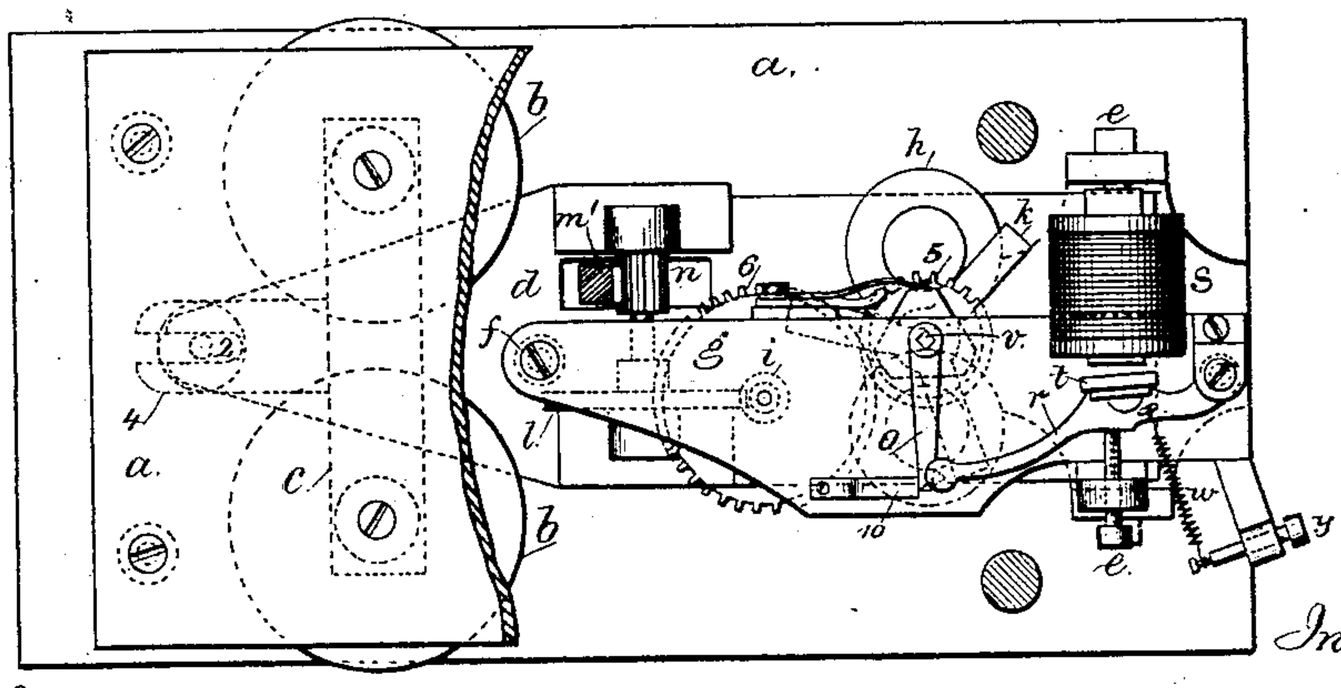


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES D. HASKINS, OF NEW YORK, N. Y., ASSIGNOR TO UNION ELECTRIC MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC-LAMP REGULATOR.

SPECIFICATION forming part of Letters Patent No. 237,271, dated February 1, 1881.

Application filed December 4, 1880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. HASKINS, of the city and State of New York, have invented an Improvement in Electric-Lamp Regulators, of which the following is a specification.

In electric lamps it often occurs that buttons or small lumps of carbon remain or accumulate in places on the carbon electrodes, and when these break off there is a sudden inequality in the light, usually a momentary darkness, until the proper length of electric arc between the carbons is restored. I make use of an electro-magnet to support the upper carbon, and there is a spring upon the armature, so that in case of any sudden change in the current passing through the electro-magnet the spring will act more quickly than the armature would, if alone, to restore the proper length of electric arc and thus lessen the inequality in the light. I also make use of a motor in a branch circuit and a resistance-magnet in a shunt, so that when the resistance to the current at the electrodes causes a rise of the electric potential, the resistance-magnet operates, by its armature, to unlatch the magnetic motor and allow the same to rotate and feed the carbon.

In the drawings, Figure 1 is an elevation of the instrument complete. Fig. 2 is a plan of the magnets and mechanism below the line *x x*, and Fig. 3 is a diagram of the circuit-connections.

The frame *a* of the lamp is of any desired character. It supports the main electro-magnet *b*, and *c* is the armature thereof.

d is a swinging secondary frame pivoted at *e*, and to which the armature *c* is attached.

2 and 3 are adjusting-screws to limit the movement of the secondary frame *d*, and 4 is a spring that is compressed when the armature is attracted and moves with the frame toward the electro-magnet *b*.

The pillars *f* connect the plate *g* to the secondary frame *d*, and between *d* and *g* there is an electro-magnet, *h*, and revolving armature *k*, that forms a magnetic motor, and, by gear-wheels 5 and 6, actuates the worm *i*, and the latter turns the wheel *l* with a slow motion.

m is a vertical carbon-holder having rack-teeth *m'* that gear into the pinion *n* upon the shaft of the wheel *l*.

The revolving armature-shaft *v* carries an arm, *o*, and this is stopped by a projection upon the detent armature-lever *r*, and *s* is a magnet of high resistance.

10 is a spring that is depressed by the arm *o* as it passes over it, and, springing up behind said arm, prevents any rebound when the arm *o* is stopped by the detent *r*.

The circuit-connections are arranged in the manner indicated in the diagram, Fig. 3. The main circuit passes from the battery or other source of power B, through the lower helix of the main magnets, thence through the frame, as shown by dotted lines, to the carbon-holder and carbons *t* and *u*, and back to the battery or other generator. When the parts are at rest the carbons *t* and *u* touch each other. The current, when brought into action, energizes the electro-magnet *b*, lifts the armature *c*, auxiliary frame *d g*, and carbon-holder *m*, and separates the carbons to produce the electric light. In this operation the spring 4 is partially compressed. If the current weakens, from any cause, usually the separation of the carbons, the electro-magnet *b* loses a portion of its power and the spring 4 expanding moves the frame *d g* instantly, and aids in restoring the carbons to their proper relative positions. There is a derived or branch circuit passing by the wire 12 to the helices of the magnetic motor, and from there to the frame and electric light, so that all the motor current goes through the carbons; and I remark that this motor is to be provided with the usual commutator to direct the current through the helices in succession; but the shaft *v* and its arm *o* cannot revolve because the stop at the end of the detent-lever *r* is in the path of the arm *o*. If, now, the resistance to the current between the carbon electrodes increases, and the current becomes sufficiently powerful in the resistance-magnet *s* to move its armature *t*, the arm *o* of the motor is unlocked, the motor revolves, and turns the gearing so as to feed down the carbon. The circuit through the resistance-magnet *s* passes from the frame, through the motor-shaft *v* and arm *o*, to the detent-lever *r*, thence to the magnet *s*, and back

to battery B or other electric source, so that the movement of the armature *t* and lever-detent *r* in separating from *o* breaks the derived or shunt circuit that passes through this magnet *s*, and the armature-lever flies back as soon as the arm *o* of the motor has separated from it, and thereby the detent-lever *r* returns to position to stop the movement of the arm *o*. Hence said arm can only make one revolution at a time.

The connections to the helix of the resistance-magnet are to be very small, so that only a weak current passes to the resistance-magnet *s*, and little or no spark will occur when the arm *o* comes into contact with the detent *r* or separates therefrom.

The motor-magnet may be in an independent electric circuit, but when introduced in the manner shown the same is not in a shunt around the carbon electrodes that lessens the electric current between such electrodes, but it is in a branch circuit leading to such electrodes. Thereby there is no loss of electric energy at the light itself. The current passing to the resistance-magnet is so very small as not to lessen the light, because this resistance-magnet has nothing to do but unlatch the motor, and I remark that the spring *w* to the armature *t* of the resistance-magnet *s* has to be delicately adjusted by the button *y*, so that the motor will be brought into action to feed the carbon whenever the light falls below a given standard, and consequently the resistance at the electric arc causes the increased energy in the resistance-magnet to operate its armature and detent.

The weight of the swinging-frame carbon-holder and mechanism may be balanced, or partially balanced, by a spring at *x'*, or by other suitable means.

I claim as my invention—

1. The combination, with the carbon-holders in an electric lamp, of mechanism for gradually moving the carbon-holder, a swinging frame for such mechanism, an armature, electro-magnet, and a spring that is compressed by the action of the armature and electro-magnet, substantially as set forth.

2. The combination, with the carbon-holders in an electric lamp, of an electro-magnet to draw one carbon from the other and establish the arc, an electro-magnet for a motor placed in a branch circuit leading to the lamp, and mechanism operated by the magnetic motor for feeding the carbons, substantially as set forth.

3. The combination, in an electric lamp, of a carbon-holder, a magnetic motor, and gearing for moving one carbon toward the other, a detent for stopping the motor, and an electro-magnet for withdrawing the detent and allowing the motor to operate, substantially as set forth.

4. The motor-magnets, the revolving shaft *v*, and arm *o*, in combination with the detent and its electro-magnet, and mechanism for connecting the motor to the carbon-holder, for feeding the same, and a swinging frame carrying the motor, and an armature and main electro-magnet, substantially as set forth.

5. In combination with the electrodes in an electric light, two electro-magnets in branch circuits leading to the light, one of which electro-magnets acts upon an armature to establish the electric light, the other acting as a motor upon mechanism that feeds the carbon, and a third electro-magnet in a shunt of high resistance passing around the light, and a detent operated upon by such electro-magnet to liberate the motor, substantially as set forth.

Signed by me this 1st day of December, A. D. 1880.

CHAS. D. HASKINS.

Witnesses:
GEO. T. PINCKNEY,
WILLIAM G. MOTT.